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Two new species of *Zasmidium* from Nepal

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Abstract — *Zasmidium cassines* on living leaves of *Cassine glauca* (*Celastraceae*) and *Z. fabaceicola* on living leaves of *Vigna unguiculata* (*Fabaceae*) are described and illustrated from a forest in the terai region of Nepal. The two new foliar fungi are compared with closely related taxa.

Key words — foliar diseases, hyphomycetes, morphotaxonomy

Introduction

During a 1993–94 survey of anamorphic foliar fungi in the forest of the terai region of Nepal, two undescribed species of *Zasmidium* were discovered. These are characterized by having planate conidial scars, verruculose superficial hyphae, and solitary to rarely catenate and usually rough-walled conidia. Verruculose superficial hyphae and rough-walled conidia are characters shared by both *Stenella* and *Zasmidium*. Molecular analyses (Arzanlou et al. 2007) have shown that the genus *Stenella* is polyphyletic and that its type species, *S. araguata* Syd. (Sydow 1930), clusters within the *Teratosphaeriaceae*. This species is characterized by pileate conidiogenous loci, while other former *Stenella* species are distinguished by having planate *Cercospora*-like conidiogenous loci and belong to the *Mycosphaerellaceae*. Arzanlou et al. (2007) also demonstrated that *Zasmidium cellare* (Pers.) Fr. (Fries 1849), the type species of the genus *Zasmidium*, clusters within the *Mycosphaerellaceae* and agrees both morphologically and phylogenetically with *Stenella*-like hyphomycetes now included in the that family. Hence, the name *Zasmidium* is available for all former *Stenella* species characterized by planate conidial scars clustering in the *Mycosphaerellaceae*.

Materials & methods

Diseased leaves were collected and dried to make herbarium specimens and deposited in Herbarium Cryptogamiae Indiae Orientalis, Indian Agricultural Research Institute, New Delhi, India (HCIO). Isotypes are retained in the herbarium of the Department of Botany, D.D.U. Gorakhpur University, Gorakhpur, India (GPU) for further reference. Microscopic slides of fungal structures were prepared in lactophenol and cotton-blue mixture from infected area of leaf. Observations were made with light microscope using oil immersion (1000×). The figures of fungal structures were drawn using a camera lucida and show all necessary details of morphology and ontogeny of reproductive propagules.

Taxonomy

Zasmidium cassines Kharwar, Arch. Singh, Raghv. Singh & Sham. Kumar, **sp. nov.** FIG 1

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Differs from *Zasmidium elaeodendri* by its verruculose superficial mycelium, shorter, narrower and less septate conidia and conidiophores.

TYPE: Nepal, Chitwan, Narayanghat, on living leaves of *Cassine glauca* (Rottb.) Kuntze [= *Elaeodendron roxburghii* Wight & Arn.] (*Celastraceae*), December 1993, coll. R.N. Kharwar, (**Holotype**, HCIO 42337; **isotype** GPU 3002).

ETYMOLOGY: the epithet is derived from the name of the host genus.

Infection spots amphigenous, brown, circular to subcircular, 1–6 mm diam., coalescing and spreading to cover most of the leaf surface. Colonies hypophyllous, effuse. Mycelium internal and external, septate, branched, verruculose, subhyaline to pale brown, up to 3 µm wide. Stromata absent. Conidiophores arising singly as lateral branches of superficial hyphae, semi-macronematous, mononematous, erect to procumbent, straight to flexuous, smooth-walled, brown, 8.5–60 µm × 2–4.5 µm. Conidiogenous cells integrated, polyblastic, terminal or intercalary, sympodial, cylindrical, conidiogenous loci cicatrized with slightly thickened scars. Conidia holoblastic, dry, acropleurogenous, simple to catenate, rarely branched, cylindrical to obclavate, straight to curved, subhyaline to olivaceous brown, verruculose, 0–6-septate, sometimes constricted at septa, base obconicotruncate with slightly thickened hilum, apex acute to subacute, 13.5–109 × 1.5–4µm.

Only one species of *Zasmidium, Z. elaeodendri* (Kamal et al.) Kamal [≡ *Stenella elaeodendri* Kamal et al.] has been previously reported to occur on *Cassine glauca* (as *Elaeodendron roxburghii*; Kamal 2010). *Zasmidium elaeodendri* differs by its lack of verruculose superficial mycelium, its longer and wider

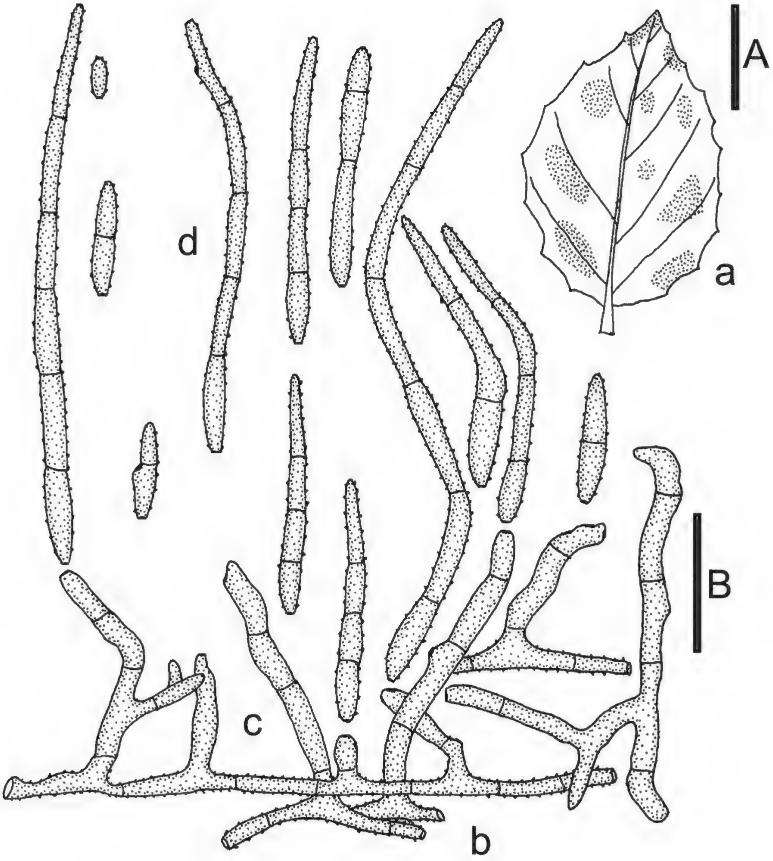

Figure 1. *Zasmidium cassines* (HCIO 42337)
a. Infection spots. b. Mycelium. c. Conidiophores. d. Conidia.
Scale bars:A= 20 mm, B = 20 µm

branched conidiophores (≥126 × 4.5–6 µm), and its much longer and thicker 17-septate conidia (≥132 × 3.5–7 µm), which are colourless, smooth-walled, and slightly curved with a conico-truncate base and a rounded apex. The proposed taxon, therefore, merits description as a new species.

Some other cercosporoid hyphomycete genera have been reported on *Cassine: Pseudocercospora elaeodendri* (G.P. Agarwal & Hasija) Deighton on *Cassine glauca* [≡ *Elaeodendron glaucum*] and *Ps. paradoxa* U. Braun & Bagyan. on *Cassine* [= *Elaeodendron*] sp. (Deighton 1976, Braun & Bagyanarayana

1999). *Pseudocercospora* differs from *Z. cassines* in the absence of thickened scars at the conidial bases and on conidiogenous loci.

Kamal (2010: 260–261) listed an erroneous record of *Scolecostigmina tirumalensis* on *Cassine glauca* [≡ *Elaeodendron glaucum*], but this is based on a record of *Stigmella tirumalensis* (Bagyanarayana et al. 1992).

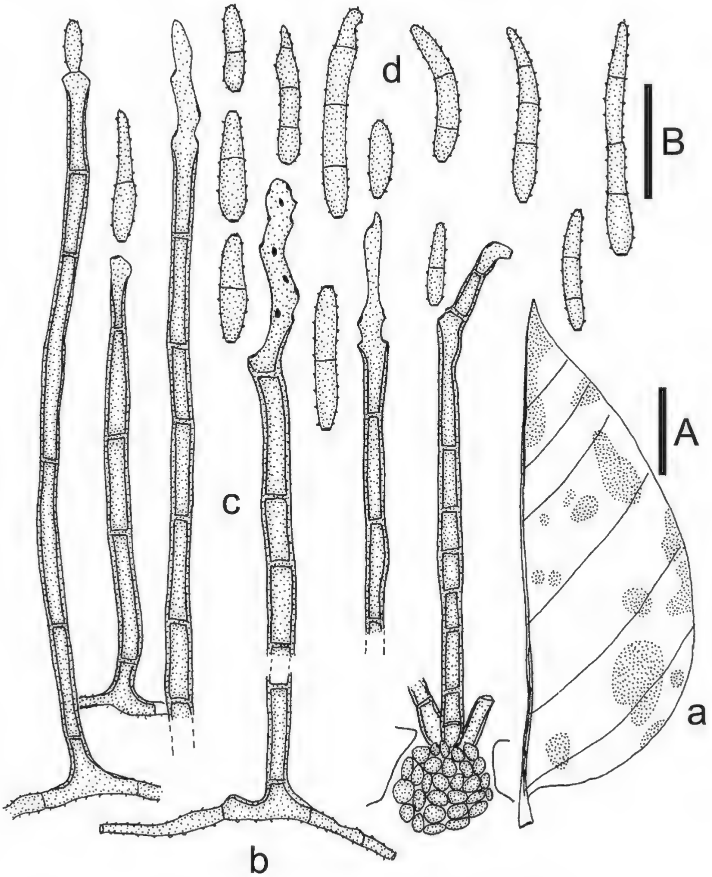

Figure 2. *Zasmidium fabaceicola* (HCIO 42338)
a. Infection spots. b. Mycelium.c. Conidiophores.d. Conidia.
Scale bars: A = 20 mm, B = 20 µm

Zasmidium fabaceicola Kharwar, Arch. Singh, Raghv. Singh & Sham. Kumar, **sp. nov.** Fig 2

MycoBank MB 809139

Differs from *Zasmidium fabacearum* by its well-developed stromata, and its shorter conidia and conidiophores.

Type: Nepal, Chitwan, Narayanghat, on living leaves of *Vigna unguiculata* (L.) Walp. [= *Dolichos biflorus* L.] (*Fabaceae*), January 1994, coll. R.N. Kharwar (**Holotype**, HCIO 42338; **isotype**, GPU 3413).

Etymology: the epithet is derived from the host family name.

Infection spots amphigenous, blackish brown, circular to irregular, 1–15 mm diam., later coalescing to form large irregular patches, sometimes covering the entire leaf surface. Colonies hypophyllous, effuse, brown. Mycelium mostly external, septate, branched, verruculose, pale brown, 1.5–3.5 µm wide. Stromata substomatal to superficial, pseudoparenchymatous, dark brown, 17–19 µm in diam. Conidiophores macronematous, arising singly as lateral branches of external hyphae, or in fascicles from stromata, erect, straight to slightly flexuous, unbranched, smooth-walled, mid brown to dark brown below and paler towards the apex, 4–12-septate, 75–210 × 1.5–5 µm. Conidiogenous cells integrated, polyblastic, terminal or intercalary, sympodial, cylindrical, geniculate, scars thickened. Conidia dry, acropleurogenous, simple to catenate, unbranched, cylindrical to obclavato-cylindrical, straight to slightly curved, brown, verruculose, 0–3-septate, sometimes constricted at septa, hilum slightly thickened, base obconico-truncate, apex rounded to obtuse and sometimes cicatrized, 13.5–40 × 1.5–5µm.

Only one species of *Zasmidium, Z. fabacearum* (K. Srivastava et al.) Kamal (2010), has been previously reported on *Dolichos*, although the host was not identified to species. *Zasmidium fabacearum* differs from *Z. fabaceicola* by its lack of stromata and by its longer conidiophores (100–310 × 2–4 µm) and conidia (12–60 × 2–6 µm).

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